TIME – 3 HR.   **MM: 80**
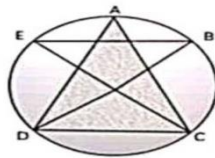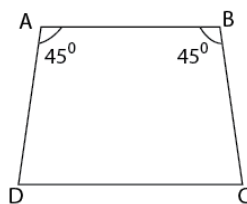
General Instruction:
1. This question paper consists of 38 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective type questions carrying 1 marks each.
4. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.
5. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source based/case based units o assessment of 04 marks each with sub-parts.

Section – A
Consists of 20 questions of 1marks each

1. If one of the solutions of equation $3x + 2y = 7$ is $(1, 2)$, then the other solution of the equation such that it will make a straight line on graph will be:
   (a) $(2, 1)$ (b) $(3, -2)$ (c) $(3, -1)$ (d) $(4, 0)$

2. If $\triangle ABC \cong \triangle PQR$ and $\triangle ABC$ is not congruent to $\triangle RPQ$, then which of the following is not true?
   (a) $BC = PQ$ (b) $AC = PR$ (c) $QR = BC$ (d) $AB = PQ$

3. In the figure shown below, the region DEABC is a
   (a) minor arc   (b) major arc
   (c) major segment   (d) minor segment

4. ABCD is a trapezium, in which AB ∥ DC and $\angle A = \angle B = 45°$. Then, $\angle C$ and $\angle D$ of a trapezium are, respectively:

   (a) $135°, 135°$ (b) $130°, 120°$
   (c) $120°, 130°$ (d) $145°, 75°$

5. If $x^2 + kx + 6 = (x + 2)(x + 3)$ for all x, then the value of k is:
   (a) 1   (b) -1   (c) 5   (d) 3

6. Sonia has a conical vessel having radius 14 cm and slant height 50 cm, the capacity of the vessel is:
   (a) 9858 cm^2 (b) 9856 cm^3 (c) 9586 cm^3 (d) 9685 cm^2

TIME – 3 HR.   **MM: 80**

7. Rahul was crossing the railway track, he noticed that the railway tracks are parallel to each other. According to Euclid's geometry, two parallel lines have _____ in common.

   (a) no point   (b) one point

   (c) two-points   (d) all points

8. The supplementary of which of the following angles (in degrees) is the same as the half the sum of the two complementary angles:
   (a) $90°$ (b) $60°$ (c) $135°$ (d) $100°$

9. In the class intervals 30-40 and 40-50, the number 40 is included in:

Classes	Frequency
10-20	2
20-30	4
30-40	8
40-50	15
50-60	10
60-70	25

   (a) 30-40   (b) 40-50   (c) both 30-40 and 40-50   (d) 30-50

10. Jitu was given a riddle by Pragya who stated that an angle is $24°$ less than its complementary angle, the angle's measure is:
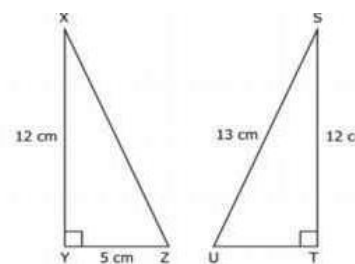   (a) $36°$ (b) $33°$ (c) $66°$ (d) $57°$

11. Consider the triangles shown in the figure. Which of the following option is not true about the given triangles?
    (a) $\Delta XYZ \cong \Delta STU$ (by SSS congruence rule)
    (b) $\Delta XYZ \cong \Delta STU$ (by RHS congruence rule)
    (c) $\Delta XYZ \cong \Delta STU$ (by ASA congruence rule)
    (d) $\Delta XYZ \cong \Delta STU$ (by SAS congruence rule)

12. Given below is a circle with centre O. Which of the following represents the measure of $\angle BCD$?
    (a) $180° + (a - \frac{b}{2})$ (b) $180° - (a + \frac{b}{2})$

    (c) $90° - (a - \frac{b}{2})$ (d) $180° - (a - \frac{b}{2})$

13. Priyanka's sister will be twice her age 3 years later. The present age of Priyanka's brother who is 3 years younger than Priyanka is:
    (a) 15   (b) 12   (c) 10   (d) insufficient information

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14.   Ramanika is of the same age as Shinu, Sona is also of the same age as Shinu. Then,
        (a) Ramanika and Sona are of same age.
        (b) Ramanika is older than Sona.
        (c) Sona is older than Ramanika.
        (d) Ramanika and Shinu are younger than Sona.

15.   How many balls of radius 1 cm can be made by melting a big ball whose diameter is 8 cm?
        (a) 54   (b) 64   (c) 36   (d) 76

16.   The mirror of the point (3,4) is :
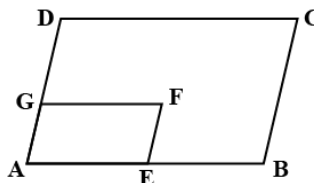   (a) (3,4)   (b) (3,-4)   (c) (-3,-4)   (d) (-3,4)

17.   A diagonal brace on the roof strengthens to prevent it from sagging. The brace make on angle $50°$ with wire as shown in the figure below. The value of y in degrees is:

        (a) $110°$ (b) $130°$
        (c) $30°$ (d) $50°$
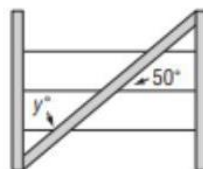
18.   In given figure, ABCD and AEFG are two parallelograms. If $\angle C = 60°$, determine $\angle F$.

        (a) $50°$ (b) $60°$
        (c) $70°$ (d) $80°$

DIRECTION: In the question number 19 and 20, a statement of assertion (A) is followed by a statement of reason (R). Choose the correct option.

19. Statement A (Assertion): $f(x) = 2 - x^2 + x^3$ is a cubic polynomial.
    Statement R (Reason): Every polynomial is a binomial.
    (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of   assertion (A).
    (b) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A).
    (c) Assertion (A) is true but reason (R) is false.
    (d) Assertion (A) is false but reason (R) is true.

20. Statement A (Assertion): Point P(1, -2) lies in IV quadrant.
    Statement R (Reason): In the cartesion system, x and y coordinates of IV quadrant are positive and negative respectively.

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(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of   assertion (A).
(b) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
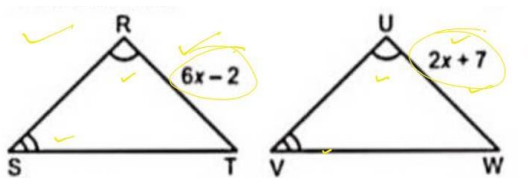(d) Assertion (A) is false but reason (R) is true.

SECTION – B
Section B consists of 5 questions of 2 marks each

21.   Find any three rational numbers between 8 and 14.

OR
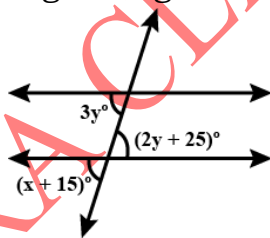
X = $\sqrt{2} - 1$, then find the value of $[x - \frac{1}{x}]^5$. 2

22.   In ΔRST, RT = 6x -2. In ΔUVW, UW = 2x + 7, $\angle R = \angle U$ and $\angle S = \angle V$.
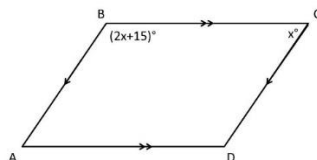What must be the value of x in order to prove that ΔUVW?

23.   Find any two solutions of the equation 3x + 2y = 6.

24.   If l ∥ m, in the given figure then calculate the value of angle x.

OR

Find the value of x.

25.   If each side of an equilateral triangle becomes four times, then how many times the original area is the new area?

SECTION – C
Section C consists of 6 questions of 3 marks each.

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TIME – 3 HR.   **MM: 80**

26. If polynomials $4x^3 + 2ax + 6x - 10$ and $3x^3 + 3x^2 - 12x + 3a$ leave the same remainder when divided by $(2x - 4)$, then prove that the value of a is -22.

27. Renu went to the vegetable market to buy potatoes and onions. She puts them in a, single bag and went home. Twice the number of potatoes is equal to thrice the number of onions in the bag. Represent above situation in $ax + by + c = 0$ form. Also, with the help of table below, find three solutions of the equation.

x	0	1	2
y			

28. Express 0.123 in the form $\frac{p}{q}$ where p and q are integers where $q \neq 0$.

29. From the figure, write the following:
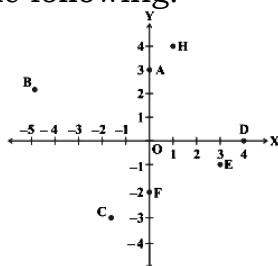
   (A) Coordinates of B, C and E
   (B) The point identified by the coordinates (0, -2)
   (C) The abscissa of the point H

OR

A city has two main roads which cross each other at the centre of the city. These two roads are along the North-South direction and East-West direction.

All the other streets of the city run parallel to these roads and are 200 m apart. There are 5 streets in each direction. Using 1 cm = 100m, draw a model of the city on your notebook to represent the roads/streets by single lines.
There are many cross-streets in you model.
A particular cross-streetsis made by two streets, one running in the North-South direction and anotherin the East-West direction. Each cross-street is referred to in the following manner: If the 2nd street running in the North-South direction and 5th in the East-West direction meet at some crossing, then we will call this cross-street (2, 5). Using this convention, find:
(A) How many cross-streets can be referred to as (4, 3)?
(B) How many cross-streets can be referred to as (3, 4)?

30. Find the length and breath of a rectangle, if its area is represented by the polynomial,
$6x^2 - 29x + 30$ and also find the perimeter.

31. In the given figure, O is the centre of the circle, $\angle AOB = 40°$ and $\angle CDB = 100°$. Find $\angle OAC$.
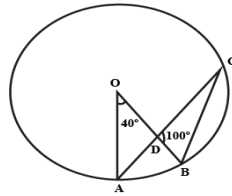
OR

PQ is the diameter of the circle and PR and QS are the chords. Extended QS and PR meet at T outside the circle. Join QR. If ∠SOR = 70°, prove that complementary ∠STR = 35°.

SECTION – D
Section D consists of 4 questions of 5 marks each

32.   In figure given below, P is the mid-point of side BC of the parallelogram ABCD such that ∠BAP = ∠DAP. Prove that AD = 2CD.
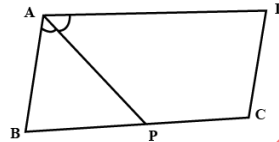
OR

D and E are the mid-points of the side AB and AC of ΔABC and O is any point on the side BC, and AO is joined. If P and Q are the mid-points of OB and OC respectively, then prove DEQP is a parallelogram.

33.   If a = $\frac{3+2\sqrt{2}}{3-2\sqrt{2}}$ and b == $\frac{3-2\sqrt{2}}{3+2\sqrt{2}}$, then what is the value of a² + b² – ab?

34.   What length of tarpaulin 3m wide will be required to make a conical tent of height 8 m and base radius 6m? Assume that the extra length of material that will be required for stitching margins and wastage in cutting is approximately 20cm. (use π = 3.14).

OR

A toy is in form of a hemisphere surmounted by a right circular cone of the same base radius as that of the hemisphere. If the radius of the base of the cone is 21 cm and its volume is $\frac{2}{3}$ of the volume of the hemisphere, calculate the height of the cone and the surface area of the toy.

35.   The cost of 1 pen is Rs.1 more than that of 5 pencils. If the cost of each pen is represented by Rs. y and that of 1 pencil by Rs. x, then write the linear equation in two variables for the situation. Plot the graph using the table given below.

x	0		2
y		6	

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SECTION – E
Case study based questions are compulsory.

36. Ananya wants to frame a question based on quadrilaterals. So, she draws a triangle KLM (as shown in attached figure) where N and O are mide-points of side KL and KM of ΔKLM. Now, she wants to prove NO ∥ LM. She constructs a ray l such that KL ∥ MP.
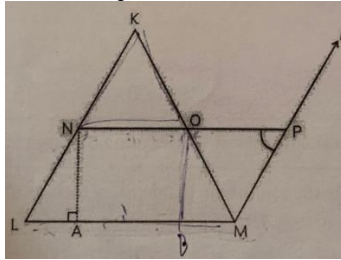
   (A) Using congruence rule, prove ΔKON ≅ΔMOP.
   (B) If LM = 12 cm. Find half of NO.

37. Red fort, also know as Lal Qila in old Delhi, India. It is a Mughal fort which was built by shah Jahan in the mid-17th century and remains a major tourist attraction. The fort was designated a UNESCO world heritage site in 2007. It is surrounded by a 2 km perimeter wall which is aced as an effective defensive measure.

   (A) A ladder was installed to clean the minaret's top. How long should the ladder be if the minaret is 8 meters tall and the base is 15 meters?
   (B) If the radius of hemispherical dome is 4m, then find its curved surface area.

OR

   If the smaller hemispherical dome's surface area (without the base) is found to be 7700 sq.m. Determine the diameter.
   (C) If the radius of the hemispherical dome is 7 m, then find its volume.

38. A teacher of Savier School wanted to analyse the performance of two sections of students in a Mathematics test of 100 marks. She looked at the performance of the students, she found that a few students got under 20 marks and a few got 70 marks or above. So, she decided to group them into intervals of varying sizes as follows: 0-20, 20-30, ..., 60-70 and 70-above. Then she formed the following table:

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TIME – 3 HR.   **MM: 80**

Marks Scored	Numbers of Students
0-20	8
20-30	20
30-40	13
40-50	18
50-60	11
60-70	17
70 above	13
Total	**100**

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(A) Find the number of students who scored less than 40 marks but more than 20 marks.

(B) If two students scored distinction are also added, then find the number of students scoring more than 70 marks.

OR

Find the total number of students scoring marks between 50-60 and 60-70.

(C) Find the number of students scoring less than 60 marks.

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